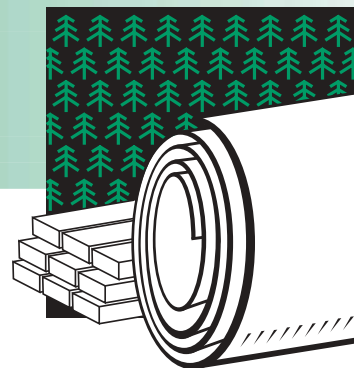


FOREST PRODUCTS

Success Story

DELTA T DRYER CONTROL SYSTEM



New Technology Revolutionizes Industrial Drying

Benefits

- ◆ Has saved over 12.6 trillion Btu cumulatively through 2000
- ◆ Requires 10% to 20% less energy for drying than conventional drying methods
- ◆ Has saved \$41.5 million in energy purchases through 2000
- ◆ Prevents overdrying and underdrying, as well as improves color, taste, and texture of food products
- ◆ Reduces emissions associated with fuel combustion by 10% to 20% as well as the amount of volatile organic compound (VOC) emissions
- ◆ Has avoided 738,000 tons of CO₂ emissions through 2000
- ◆ Eliminates in-dryer fires in forest product drying operations.

Applications

Industrial dryer control for plywood, lumber, textiles, carpet, food, snack food, plastic pellets, mining, paper, corn wet milling, pet food, oriented strand board (OSB), tobacco, non-wovens, and activated carbon.

"I couldn't have succeeded without the [DOE] grant."

— John Robinson
Inventor and President
Drying Technology, Inc.

Many materials, such as trees, textiles, and agricultural products, have naturally occurring moisture, and manufacturers rely on dryers to remove the excess water. Industrial drying consumes about one quad of fossil fuel energy annually in the United States, equal to all U.S. residential energy use annually. A 2% reduction in U.S. dryer energy consumption would equate to savings of about 4 million barrels of oil per year.

Because of the technical inabilities of industrial dryers to sense moisture, manufacturers must estimate the length of time drying will take. Frequently, this results in overdrying products to guarantee dryness or re-drying products that are underdried in the initial drying cycle. Products can be overdried to such an extent they must be scrapped. Some manufacturing plants report that 15% of their products undergo redrying. Other manufacturers rely on sampling by having personnel periodically check the product for dryness during the drying cycle. All of these practices waste energy, time, material, and money.

Technology Description

With help from a grant from the U.S. Department of Energy's Inventions and Innovation Program, John Robinson created a sensor and control mechanism



Delta T Dryer Controls



called Delta T Dryer Control that works inside industrial dryers. Temperature probes continually measure the moisture content of the product inside the dryer during the drying cycle and readjust the time and temperature of the dryers accordingly. In 1992 Delta T Dryer Control was extended into additional industries for further proof of its effectiveness. The dryer works using a mathematical equation to continually adjust the temperature based on information provided by the temperature probes. Customized control mechanisms have been created to work within the wide variety of dryers in manufacturing including conveyor, rotary, flash, fluidized bed, and rotary louver. The Delta T Dryer Control has customized control screens, which operate in the Microsoft Windows' environment.

Energy Savings and Pollution Prevention

A Weyerhaeuser mill in Pennsylvania applied the Delta T Dryer Control to measure the drying of red oak veneer using a screen dryer. Production was increased by 20% and product overdrying was eliminated. Overall, customers have reported production increases of 4% to 30%. The Delta T Dryer Control can also improve product quality. In the plywood industry and non-wovens industry, it has reduced product redrying by 33%. Delta T Dryer Controls automatically convert dryers to idle when not in use. Cumulative energy savings through the year 2000 have surpassed 12.6 trillion Btu. The associated reduction in CO₂ emissions is estimated to be 738,000 tons and avoided energy purchases total \$41.5 million.

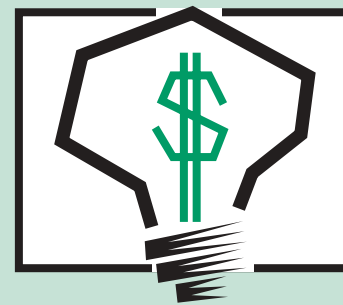
System Economics and Market Potential

The new technology has already been implemented in the agricultural, forest products, food, chemicals, textiles, pet food, snack food, non-wovens, coffee, tobacco, and plastics industries. Introducing the Delta T Dryer Control to industry has increased production by an average of 10%. The Delta T Dryer Control also ensures product consistency and integrity. Improving the control of a large tonnage rotary dryer processing agricultural product consistency and integrity. Improving the control of a large tonnage rotary dryer processing agricultural products and increasing the average moisture control by 1%, for example, results in approximately \$500,000/dryer/year in additional revenue.

INDUSTRY OF THE FUTURE — FOREST PRODUCTS AND AGENDA 2020

*In November 1994, Department of Energy's (DOE's) Secretary of Energy and the Chairman of the American Forest and Paper Association signed a compact establishing a research partnership involving the forest products industry and DOE. A key feature of this partnership was a strategic technology plan: **AGENDA 2020: A Technology Vision and Research Agenda for America's Forest, Wood & Paper Industry.** Agenda 2020 includes goals for the research partnership and a plan to address the industry's needs in six critical areas: energy performance, recycling, environmental performance, sensors and controls, capital effectiveness, and sustainable forestry.*

OIT Forest Products Team Leader: Valri Robinson (202) 586-0937.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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Order # I-FP-536
December 2001